The Excavating Engineer

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United States Reclamation Work on the Klamath Project in Oregon

Operating Costs and Efficiency of Dragline Excavators on Canal and Drainage Ditch Work

OVER 140,000 acres of arid land in southern Oregon and northern California are now being reclaimed by the United States Reclamation Service. This work, known as the Klamath Project, will make this vast territory suitable for farming.

Several attempts have been made from time to time to irrigate this tract of land but very little was accomplished. The first irrigation, through a private system, took place in 1890 but was only moderately successful.

The first irrigation under the direction of the United States Reclamation Service took place in 1908, and work was carried on intermittently up to 1914. Due to the fact that entirely too much water was used by the settlers, some of the project lands became water-logged.

In December, 1914, surveys were made over the entire project in order to make it possible to carry on the work to better advantage. Lines were run every half mile commencing with the upper end of the project and running east and south. The equipment used was the ordinary Wye level and chain. Readings were taken every 100 feet, while at approximately every 300 feet, a soil test was made with a 1½" soil auger, to determine the character of the soil and elevation of the ground water. The question of seepage was also carefully studied.

About 1915 the water users agreed to an extra charge of not more than $12.50 per acre for trunk drains to protect the first unit of the project, which contains an irrigable area of approximately 29,000 acres. By two special contracts funds were made available to provide trunk drains for 2,000 acres additional. Work has been carried on steadily ever since.

How the Project Is Irrigated

The Klamath Project is now irrigated by three main canals, which supply water for 50,000 acres of project lands, and about 3,000 acres of pump lands. The sizes of the three main canals are as follows: The principal canal is 9 miles long, 40 feet wide, and has a capacity of 1500 cubic feet per second. Canal "C," 11 miles long and 26 feet wide has a capacity of 300 cubic feet per second. Canal "D" is 25 miles long, 25 feet wide, and has a capacity of 150 cubic feet per second.

170 miles of laterals will be necessary on this project. These vary in size from 4 feet in width with a capacity of 10 cubic feet per second to 15 feet in width with a capacity of 50 cubic feet per second. Up to December 31, 1920, the total excavation on the project, including all classes, amounted to 4,000,416 cubic yards.

Excavation Work

The soil on the project consists generally of sandy loam for the upper two to four feet underlaid by chalk hardpan or water-tight sand. All the excavation is being done by machines owned by the Government.

The first excavator purchased was a Stockton Wheel Tractor with a ½-yd. bucket. In 1914 a Monighan Type 1-A dragline and an Austin Type 00 special trenching machine were purchased. A Monighan Type 1-T walking dragline was added to the equipment in 1917. In the latter part of 1919 the Stockton machine and the 1-A Monighan were sold and in the winter and spring of 1921 a 30-B Bucyrus dragline, equipped with a ½-yd. bucket and 50-ft. boom or a 1-yd. bucket and 35-ft. boom, and a Class-14 Bucyrus dragline with a 74-ft. boom and a 1½-yd. bucket or a 2-yd. bucket and 60-ft. boom, were delivered to the project. All these machines were driven by gasoline and with the exception of the trenching machine were operated three shifts a day, Sunday being used for making repairs.

The Monighan walking dragline, the Bucyrus 30-B dragline and the Class-14 Bucyrus dragline are now being operated. The Monighan and the Class-14 Bucyrus are digging canals and the 30-B Bucyrus is used for cleaning out drains which have filled up. The canals that the Monighan is building average 25 feet in width with a 3-foot cut and 7-foot bank. The Class-14 is working on canals 25 feet wide and the cut averages 10 feet. The material is mostly sand with some hard chalk.

Two views of the Class-14 Bucyrus dragline crossing a canal on the Klamath Falls Project. It was at first expected that the bridge would be reinforced by piles. The pile driver appears in the picture. Later it was decided to run the machine through the canal, which was successfully accomplished, although in climbing out the machine was tilted at such an angle that the flywheel ran in the water.

The Class-14 Bucyrus crossing another canal. Notice the steep bank.

Costs of Excavation

Up to May 1, 1921, the total quantity excavated by draglines amounted to 1,350,000 cubic yards. The average field cost was 12c. per cubic yard which includes all field costs such as moving, establishing camp, supplies, etc.

The following information on the costs of operation and machine efficiency and the operator's report are taken from the records of the United States Reclamation Service.

Dragline Number 121248, 30-B Bucyrus Costs—June 1921

Labor, machine crew	$ 340.16
Labor, ground crew or pitman	220.26
Power or fuel, cost of	418.62
Lubricants	37.93
Wire rope	44.39
Tracks and floats	18.38
Camp operation and maintenance	26.72
Miscellaneous supplies and minor repairs to equipment	27.15
Equipment charge, current rate	778.12
	$1911.73

During the month of June, 1921, this dragline cleaned 13,072 linear feet of drains. The total amount of material excavated was 12,129 cubic yards, working 51⅞ eight-hour shifts.

Dragline Number 121473, Class-14 Bucyrus Costs—June 1921

Labor, machine crew	$ 376.13
Labor, ground crew or pitmen	300.37
Labor, miscellaneous (men and teams)	92.89
Power or fuel, cost of	1297.46
Lubricants	68.30
Wire rope	103.99
Miscellaneous supplies and minor repairs to equipment	109.29
Equipment charge, current rate	1159.38
	$5507.81

This machine excavated 35,020 cubic yards during the month, working a total of 45⅛ eight-hour shifts. The work was digging ditches. 30% of this material was through hard chalk ordinarily requiring blasting but handled by the dragline mostly without blasting.

Ben Daniels and Earl Biggs operated the 30-B Bucyrus dragline on opposite shifts during the part of the period covered in the operator's report below, and Earl Brooks and Jack Renton handled the Bucyrus Class-14 dragline. George Rudolph, foreman, Charles Waldrip and Joe Higler were operators on the Monighan. The operator's report given below covers the period from January 1 to September 1, 1921. No records were kept of the 30-B because all yardage was estimated.

Operator's Report — Period January 1st to September 1st, 1921

	Cu. Yds.	Lin. Ft.	Total Hours Operat.	Total Shifts	Av. Lin. Ft. Per Shift	Av. Cu. Yds. Per Shift	Av. Cu. Yds. Per Hour	
Rudolph	35121	12186	617	121	100	290	57	Monighan
Waldrip	42460	13986	770	123	113	345	55	
Higler	34854	11411	667	98	116	356	52	1-T
Brooks	34741	4665	352	53	88	653	98	Bucyrus Cl.
Renton	25749	2041	203	31	65	830	126	
Daniels	7623	420	64	11	38	691	119	14-C

Note: No shifts were considered except those employed excavating.
The total hours are the actual hours operating, all delays having been deducted.
No record kept of Bucyrus 30-B because all yardage was estimated. Both the Monighan and Bucyrus Class-14 were building canals during the period included in the above.

The indications are that the three draglines now on the project will be operated on canal excavation for some time to come as there is no likelihood of more drainage being done on the Klamath Project for a considerable time.

The excavation work on the project was carried on under the direction of Messrs. J. G. Camp, J. B. Bond, and H. D. Newell, Project Managers. Mr. Willard L. Smith has had charge of the field work, including the operation of the machines, for the last four seasons.

Digging Ready-Mixed Road Material

The Salina Gravel Company are Loading 60 to 70 Cars of First-Class Gravel per Day at Their Pit near Muskogee, Oklahoma

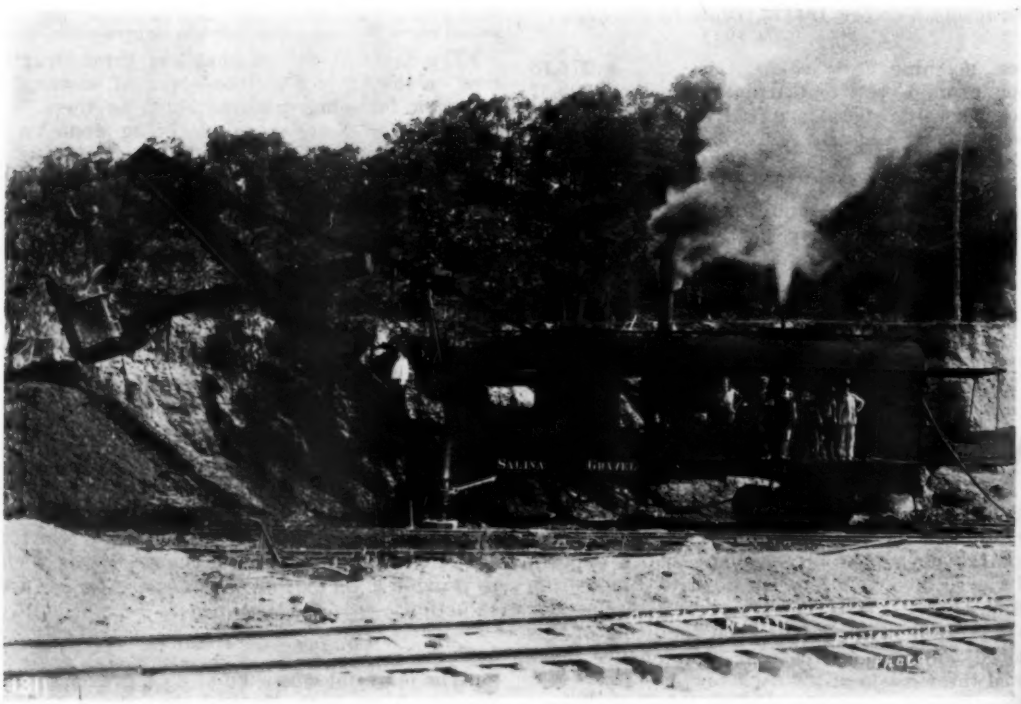
ABOUT four years ago the Kansas, Oklahoma and Gulf Railroad put through a new line near the banks of the Grand River, about forty-five miles north of Muskogee, Oklahoma. Here, during the course of the work, the engineer in charge unearthed an excellent gravel deposit, and was so favorably impressed by its composition that he hauled it for miles to serve as ballast for the new road. The present good condition of this roadbed, and the low cost of maintenance, have proved the wisdom of his decision.

No attempt was made to work this vast deposit of gravel until about six months after the railroad had been completed. At this time J. A. Barbre of Muskogee realized the possibilities of using this gravel for highway work and investigated the proposition thoroughly. The results of this investigation were very satisfactory and it was found that the composition of the material was such as to provide a very good natural base for road construction.

Composition of the Gravel

The material consisted of 85% gravel, of a size acceptable to both Federal and State Highway specifications, the other 15% consisting of clay

The pit of the Salina Gravel Company showing the three shovels in operation. The two 70-C Bucyrus shovels are in the foreground, and the Class-45 Atlantic can be seen on the right. One of the Bucyrus shovels loads a 37-yard car in 4¾ minutes.



One of the 70-C Bucyrus shovels in the pit. This shovel loaded 62 cars in 4 hours and 55 minutes.

and decomposed chert binder, mixed in such proportions that the material was practically self-setting.

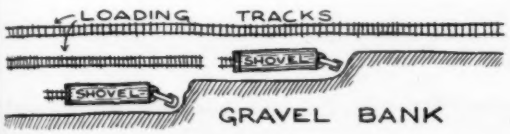
Mr. Barbre determined to lose no time in marketing the gravel, and associated himself with M. R. Ammerman of Wichita, Kansas, who was one of the best-known road contractors in the Southwest. These two men formed the Salina Gravel Company, acquired the property, and installed equipment.

The venture was a success from the start. Ten thousand cars were sold within ninety days from the first day of operation and the business of the Company has been practically up to the maximum output of the plant ever since operation began.

Over 300 miles of completed road or road now under construction has a Salina Gravel base. This is a striking testimonial for a concern which has been operating but three and one-half years.

Steam Shovel Operation in the Pit

All gravel is dug from one pit by three railroad type shovels. One Class-44 Atlantic equipped with a 2-yd. dipper and two 70-C Bucyrus shovels with 2½-yd. dippers are in use. The pit was first operated entirely by the Atlantic, which was installed in 1918. The two Bucyrus shovels were put on the job in June, 1921. At present the Company owns about 200 acres of land and the cut is about half a mile long. The accompanying diagram shows how the pit is operated.



Most of the gravel is dug by the two 70-C Bucyrus shovels, as the Atlantic shovel is not used much. The gravel runs from 15 to 30 feet in depth and is dug without blasting. The bottom of the pit is soft rock. The gravel is of such high quality that no screening is necessary.

The shovels load directly into railway gondola cars which average 37 cubic yards capacity. The 70-C Bucyrus shovels each load a car in 4¾ minutes. The highest output record was made by one of the 70-C's when 62 cars were loaded in four hours and fifty-five minutes.

Very little stripping is necessary. The overburden runs from nothing to 12 inches in depth, and is removed by a Western elevating grader. The overburden is hauled about 1000 feet and dumped in a creek bed.

The drainage is good in the pit, and no pumping is necessary. Water sometimes comes up to 18 inches, but the shovels and cars are run right through it, with no trouble. Standard gauge track with 30-foot rails are used in the pit.

Salina Gravel is widely used for roads throughout the state of Oklahoma and makes an excellent road building material. It has been used very successfully as a base for concrete roads, as well as for making a complete hard surfaced road. With the spread of the good roads movement, the Salina Gravel Company is looking forward to an even greater volume of business in the future than in the past.

General Excavation Work Improving.

From statistics published by the Engineering News-Record, construction lettings during January represented double the volume for the same month in 1921.

It is particularly interesting to note that the value of excavation contracts let in January was nearly double that of January 1921, whereas the figure for streets and roads was $3,500,000 greater than in January of last year.

"The Old Shovel Man"

(S. L. Tracey in a contemporary.)

We read about our heroes
Who have fought on sea and land
But never a word is spoken
About the old steam shovel man.
For it was his hand that gave us
The good things of today
In a thousand towns and hamlets
All along the right-of-way.
Through the wilderness and deserts
In the days of other years
The shovel man was happy
Amid the grinding of his gears.
With his hand upon the throttle
And his eye along the boom
He ripped and tore his way through
Hills of rock and sand and loam.
So let us give some credit
To where the credit's due,
To the nero of the shovel
Who got the railroad through.

Back Numbers of Excavating Engineer Wanted

Should any of our readers have no further use for the back numbers of The Excavating Engineer listed below, it would be appreciated if they would return them to The Excavating Engineer, South Milwaukee, Wis. 15c. apiece will be paid for those copies received in good condition. The following copies are wanted:

April	1913	November	1915
August	1913	April	1917
April	1914	October	1920
October	1915		

The Excavating Engineer

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Two Announcements of Note

It is rare, even in this day of remarkable achievements, that we can announce in the same issue of our paper two improvements in the design of excavating machinery that are sufficiently out of the ordinary to warrant editorial notice. However this may be, two such announcements are made in this issue of The Excavating Engineer.

A Dollar a Day for Fuel

Perhaps the most remarkable of the two is the development of an internal combustion engine of the full Diesel type for a small revolving shovel which will burn a cheap, low grade of fuel oil at a cost estimated at a dollar to a dollar and a quarter per day, a saving over a steam shovel of the same size more than sufficient to pay the operator's wages for the day.

Caterpillars for Railroad-Type Shovels

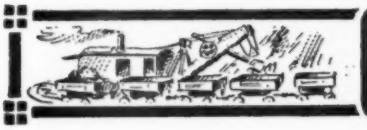
The second will perhaps be of more direct interest to many of the old steam shovel men whom we honor as our readers; the perfection of a caterpillar mounting for any size or type of railroad-type shovel.

For the past eleven years we have seen the rapid application of caterpillar traction to all types of light and medium weight excavating machinery. In fact, this mounting has proved itself so practical and such a great money saver, that it has come to be rare that a purchaser of a small revolving shovel or dragline does not demand that it be mounted on caterpillars.

It would be a mistake, however, to consider that heavier machinery cannot be so mounted with complete success. Within the past eight years one manufacturer alone has built well over 100 caterpillar mounted, excavating machines weighing from 125,000 pounds to 440,000 pounds, all of which have been performing in a most satisfactory manner.

The performance of a caterpillar mounting on railroad type shovels, therefore, is but the natural development in the constant improvement that has been going on in excavating machinery design. We feel, however, that the economies and operating expenses made possible by this new application are so striking, and concern so many readers of our paper, that this announcement deserves particular note.

A description of both these new applications may be found in another part of this issue.



· FIELD NOTES ·

Extension of Earth Work Tables

In our December number, on pages 402 and 403, we published formulae for extending earth work tables to center heights beyond those for which these tables were constructed. Several contractors and engineers have asked us questions relative to the use and further extension of these tables which we are glad to answer below.

Can some similar extension be made in WIDTH of base of cut or crown of fill?

Tables A, B and C given in our December issue can be extended to any width by the use of the following simple formula. Look up in the appropriate table the volume for a cut or fill 10 feet narrower than yours. To this figure add 37 times the center height.

Or look up the volume for a cut or fill 20 feet narrower than yours and add 74 times the center height. This principle can be extended to any reasonable width.

Conversely, if you have a narrower cut or fill than the table gives, look up the volume for a cut or fill 10 feet *wider* than yours, and *subtract* 37 times the center height.

Example: To find the volume of a 100-foot cut, 12 feet deep, 32-foot base, side slopes 1½ to 1. Look in Table B under 12-foot center, 22-foot base, getting 1,778. Add 37 times 12 equals 444. Answer 2,222 cubic yards.

Second example: To find the volume of a 100-foot fill, 9 feet deep, 40-foot base, side slopes 2 to 1. Look in Table C under 9-foot center and 20-foot

base, getting 1,267. 37 times 9 equals 333. Add this twice. Answer 1,933 cubic yards.

How should one use the earth work tables printed in your December number to compute the volume of a levee with a 3-to-1 front slope, 2-to-1 back slope and 6-foot top?

Add together the figures for 18-foot base in Tables A and B and subtract 111.1 times the center height.

Example: Center height 20. 2,815 + 3,556 — 2,222 = 4,149.

We give below a table, computed in this manner, which might prove of value. This table gives the volume in cubic yards for 100 feet of a levee of the dimensions above mentioned, for heights from 10 to 25 feet.

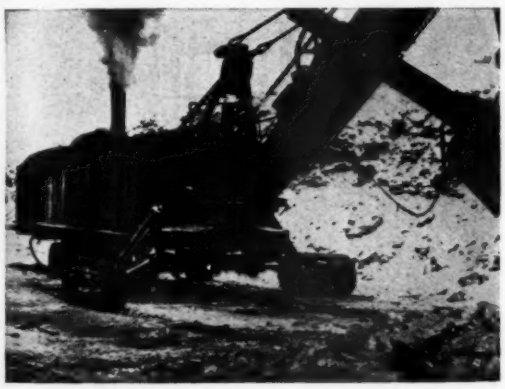
Height, Feet	Volume, Cu. Yds.
10	1,148
11	1,365
12	1,600
13	1,854
14	2,125
15	2,418
16	2,726
17	3,054
18	3,401
19	3,766
20	4,149
21	4,551
22	4,971
23	5,409
24	5,868
25	6,343

DEVICES YOU OUGHT TO KNOW ABOUT

Caterpillars for Railroad Type Shovels

The Bucyrus Company has recently announced that it is prepared to equip all sizes of railroad type shovels with caterpillar traction.

This announcement, because of the economies of operation thus made possible, should prove of particular interest to all present users of rail-



A Good View of the Two Forward Caterpillars

road-type shovels as well as to prospective purchasers.

This installation may be made on all sizes of railroad type shovels up to the heaviest now built.

The principal advantages of mounting a shovel of this type on caterpillars may be summarized as follows:

No time lost in moving up.
An ordinary move requires about 10 seconds only.
No rails to lay.
No jacks to release and set.
No stops during operation to reset jacks.
The shovel is always ready to dig.
The shovel does not have to face blasting.
May be moved back out of way quickly and easily.
Can be turned around quickly.
No track trouble when in water.
In emergencies, such as slides, can be moved back quickly out of danger.
Shovel can always dig at most effective distance from bank; short moves easy and quick to make.
No delay on account of boulders rolling in close to shovel.
Lighter work for pitmen.
Saves from 2 to 4 pitmen and sometimes more.
Can travel and work on approximately same character of ground as shovel on railroad trucks.
Where shovel on railroad trucks requires blocking under jacks and both rails, when working on soft ground, the shovel on caterpillars requires blocking only under the caterpillars.

This mounting consists in general of two forward caterpillars, replacing the jack arms, and two rear caterpillars mounted under the rear end of the shovel.

The front caterpillars are so designed that they can swivel and adjust themselves to uneven-

ness of the ground. Both front caterpillars are drivers.

The rear caterpillars consist of two caterpillar units mounted on the same frame. They are designed with sufficient strength to permit the crossing of holes and ditches without the delay incidental to filling in.

Steering is accomplished through the rear caterpillars. The massive steering arm is integral

The Caterpillar Mounting Makes it Much Easier to Move the Shovel Around the Pit

with the pintle of the rear caterpillar trucks. It carries a heavy gear segment which engages a pinion on a vertical shaft. It is driven by an independent center valve, reverse type engine, suspended underneath the car frame. This engine may be operated either from the operator's stand or from ground alongside the rear caterpillars. Steering in curves of large diameter can be accomplished by the swinging of the boom without the steering mechanism.

Propelling is accomplished through the front caterpillars. Both caterpillars may be driven together or each one independently, forward or backward. The propelling speed is about half a mile per hour. The tractive power is sufficient to enable the shovel to climb with ease 15 per cent to 20 per cent grades.

For transportation by rail, railroad trucks may be easily substituted.

The Bucyrus Company was the first manufacturer to equip dragline excavators with caterpillars, over eleven years ago; it was the first to apply this mounting to revolving shovels; the first to mount tower excavators weighing over 200 tons on caterpillars; it is now the first to design and build a caterpillar mounting for railroad-type shovels of all sizes.

The mounting of heavy excavating machinery on caterpillars is no experiment with this company.

Well over one hundred caterpillar mounted Bucyrus machines weighing from 65 to 220 tons have been sold within the past eight years and are operating with unqualified success.

Those interested in obtaining further information may do so by means of the postal card which will be found enclosed in this magazine.

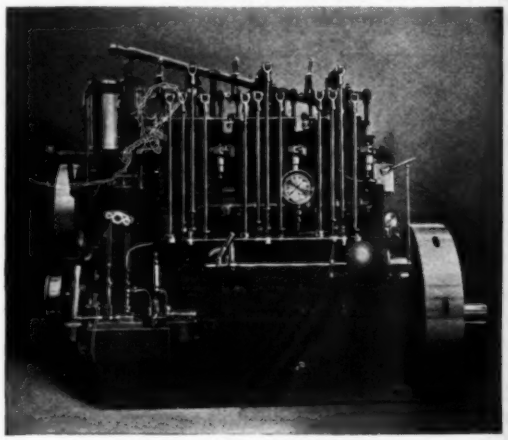
A Dollar a Day for Fuel

A few months ago the Bucyrus Company announced the addition to their line of products of a gasoline shovel of a distinctly novel and very much improved type, the most revolutionizing feature of which was the ingenious method of operating the thrust without the use of an independent engine mounted on the boom whereby even more power is obtainable than with a steam shovel of the same size.

This company has now developed, after a long period of thorough experimentation, the use of a Diesel type engine for this shovel. The importance of this announcement lies principally in one outstanding fact, the fuel cost.

This shovel, known as the Bucyrus 30-B oil shovel, will use as fuel, any cheap, low-grade oil of high-heat value which will flow freely.

The saving in the cost of fuel thus obtained is almost unbelievable. This machine has been under severe test for several months, under strenuous winter conditions, both as a shovel and as a dragline. These tests have shown that with fuel oil at 6c per gallon this machine will consume 1¾



The Diesel-Type Engine for the 30-B Bucyrus

to 2¼ gallons of fuel oil per hour. This means a fuel cost of 10½c to 13½c per hour or, roughly, between $1.00 and $1.25 per day of average operation.

The phenomenal economies thus made possible to a shovel or dragline operator may be realized by comparison with a steam shovel of the same size. All practical men who read this know that the fuel cost of any shovel differs widely in dif-

ferent sections of the country. Conservatively stated, however, such a shovel will burn about 1½ tons of coal in 10 hours. With coal at $6 per ton delivered, this means a daily fuel cost of not less than $9. A saving of $8 per day on fuel alone is thus possible. To this figure may be added several other items thus eliminated, notably, the saving made possible in not having to pay the cost of a team to haul water and coal.

To bring this home a little more forcefully, the resulting saving should pay the wages of the operator for the day with a considerable balance to spare.

The engine is of the full Diesel type, not the semi-Diesel. It is what is known as a mechanical injection engine, developing 55-H.P. at the conservative speed of 360 R.P.M. Its cylinders are 8 x 10½". It is a heavy-duty, slow-speed engine of particularly rugged and heavy construction, adapted well to the severe service it must undergo in excavation work.

This Diesel type engine differs from the gasoline engine principally in that it is a constant pressure engine, the fuel being burned directly in the cylinders without the aid of a carburetor, spark plug or outside heating appliances. In the gasoline engine the mixture is taken into the cylinders, compressed, and then ignited by some auxiliary mechanism. The pressure then rises in the nature of an explosion. In the Diesel type engine the fuel is injected into the cylinders at a constant pressure in an atomized state. It is fired by the heat developed by the compression of air in the cylinders on the previous stroke. Thus the sudden pressure due to the explosions in the gasoline engine is eliminated, making the engine steadier running and easier to maintain.

The Diesel type of engine is no more of an experiment than a steam engine and is equally reliable. It is of a well-tried design, being based on 20 years of engine builders' experience.

As stated before, its especial value is the very low-grade fuel that can be used with entire satisfaction, thereby revolutionizing the cost of operation for a machine of this size.

The 30-B oil machine, equipped with a Diesel engine, may be furnished either as a shovel, a dragline, a clamshell excavator or a locomotive crane.

More detailed information may be obtained from the Bucyrus Company upon application. The inclosed postal card will be found useful for this purpose.

SHOTS FROM THE FIRING LINE

Arizona

Jack Miller tells us that he has finished his work with the Imperial Irrigation District, where he has been running a Bucyrus dragline. He expects to stay out in this part of the country, if he can locate a good job.

Central States News

BY MARK J. WOODHULL, CHICAGO, ILL.

A. C. Duesing of the C. R. Cummins Co. was a recent caller in Chicago.

Mr. John R. Scott of St. Louis and E. P. White of Kansas City were recently awarded contracts for building sixty miles of new railroad from Satanta, Kas., to a point near Springfield, Colo., for the Atchison, Topeka & Santa Fe Ry.

A. A. Nisely of Sprague & Nisely Construction Co., Beatrice, Nebraska, also was a recent caller in Chicago.

Mr. J. E. White and Mr. Swanson of the White Clay Mining Co., Pittsburgh, Pa., passed through Chicago on their way South.

Mr. Ira Clemens, President and General Manager of the Clemens Coal Co., Pittsburg, Kansas, passed through Chicago on his way East.

Preliminary survey is being made by the Missouri, Kansas & Texas Ry. for a branch line from Chetopa south into the newly discovered coal fields of southern Kansas.

The Cleveland, Cincinnati, Chicago & St. Louis Ry. will build 12 miles of second main track from Farmland, Ind., to Muncie, Ind.

Mr. Chas. C. Loptien, Secretary and Mr. J. Oscar Johnson, Plant Manager of the Moline Consumers Co., were visitors in Chicago.

The Kelly Island Lime and Transport Co. of Marblehead, Ohio, have recently equipped one of their Marion railroad type shovels with caterpillars designed and built by the Bucyrus Company. Walter Meyers is running the shovel, with John Kosar craning and Adam Rozak firing. A. S. Deringer is Superintendent of the plant. E. M. Phillabaum is Assistant Superintendent and T. T. Pokey is Master Mechanic. This unusual application of caterpillars has proven a complete success.

George Mac Gilvary and J. E. Burns are operating a 225-B Bucyrus shovel for the Narva Coal Company at Cadiz, Ohio, on opposite shifts. J. E. Booth and Con Spell are craning. Jess Fromm and Norman Fromm are on the Marion 36. J. B. Smith is Superintendent.

Albert Wagner and James Wyle are operating a 225-B Bucyrus on opposite shifts for the Cadiz Block Coal Company at Cadiz, Ohio, H. Lang and Carl Ivans are craning and Charles Wenner is Superintendent.

Bert Persuett is operating a 70-Ton Bucyrus for the Waller Brothers Stone Company at McDermott, Ohio, James McCoy is craning.

L. E. Boom is operating a 70-Ton Bucyrus shovel loading slag for the Wellston Iron Furnace Company at Wellston, Ohio, C. E. Ramsey is craning.

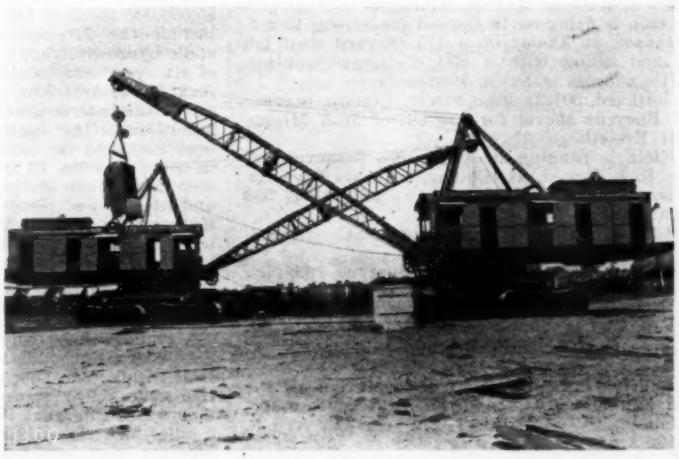
Charles James and Vincent Willowby are operating a steam shovel for the Loami Coal Company at Cadiz, Ohio, on opposite shifts. Lawrence Smith and "Buck" Brown are craning.

J. R. Black, J. B. Forsythe, R. H. Snyder, Harry France, S. C. Cranford, M. J. McNierney, Clyde Reed, R. Jones, A. Ankron, M. M. McIntire, Paul Simpson, Bernard Turnbloom are the three crews making the dirt fly on the Bucyrus 225-B, for the Enos Coal Mining Co. This shovel is stripping coal at Spurgeon, Ind.

The Bucyrus 14-B shovel shown above is dig[illegible]
Finance Corporation in San Domingo. [illegible]
The output averages 650 cubic yards [illegible]
fuel in a sta[illegible]

The photographs above and on the right show two Class-14 Bucyrus gasoline draglines working on the Newlands Project of the United States Reclamation Service.

an irrigation project for the West India Sugar
feet wide at the bottom with a 1 to 1 slope.
r day although wood is being used as
rning boiler.



READY FOR ACTION

Two new Class-14 Bucyrus gasoline draglines just after being erected on the Newlands Project of the U. S. Reclamation Service, at Fallon, Nevada. The two photos on the left show these machines on the job.

Eastern District

BY E. B. WILLIAMS, NEW YORK

Fred Schneider is using his 30-B shovel for apartment house foundation at 184th St. and Morris Avenue, Bronx, New York. Excavation consists of old foundations, boulders, furniture of every description including an old piano. John Bernado is operating and J. Volpe is firing.

Handy Brothers are digging an apartment house cellar with their 18-B Bucyrus shovel at Kingsbridge Road and the Concourse, New York. A. Belli is operating the machine and Phillip Rinaldi is firing.

W. R. McLaughlin is operating an 18-B shovel and Jack White is firing same for the Bronx Parkway Commission. A. P. Milen is operating a 30-B dragline for the Bronx Parkway Commission.

Robert Dafilippi is operating and Ernest Dafilippi is firing a 14-B shovel on cellar work at 61st Street between 4th and 5th Avenues, Bronx, New York, for the Volpe Contracting Company, Inc.

Mr. Dave Miller of 23 E. Nilsson Street, Brockton, Mass., is loading coal with a Brownhoist machine for the New Haven Railroad at Holbrook, Mass.

Florida

J. B. Carlton is operating a Class-175 Bucyrus dragline for Swift & Company at Alafia. His address is R. F. D. No. 1, Plant City.

Kansas

The Atchison, Topeka & Santa Fe Ry., in connection with its appropriations for improvements on its southwestern lines, has set aside $1,400,000 for a branch line in southwestern Kansas and a new main second track.

Minnesota

Thomas Jenkins is operating a Marion shovel, stripping and loading from ore for A. Guthrie & Company at Calumet; his address is Marble, Minnesota.

Ted Butzon is firing on 18 Osgood for Strom, Degerness and Hanson at Akeley on a 175,000-yard road job excavating and filling with a 850-yd. capacity output per day. His address is Nevis, Minnesota.

Chas. Gotthard, 507 Jackson Street, Eveleth, is craning a 95-C Bucyrus shovel for the Oliver Iron Mining Company at Eveleth.

C. R. Klein is running an Austin No. 5 shovel and dragline for E. F. Remer, at Hibbing, on State Highway work and basement excavation. Klein's address is 333 South Pascal Street, St. Paul.

Gust Munson is running a Bucyrus 100-C. His address is Box 260, Nashwauk.

F. Sullivan is craning a 70-Ton Bucyrus stripping overburden and loading ore. His address is Ironton.

O. G. Scott is Master Mechanic for S. J. Peterson of Minneapolis who is doing excavating and road work. He may be reached at 2540 Brighton Avenue, N. E. Minneapolis.

J. I. Rukarina is craning a Model-91 Marion for the Oliver Iron Mining Co. His address is P. O. Box 105, Aurora, Minn.

J. L. Guffin is running an Osgood-18 for the city of Minneapolis on road improvement work. His address is 3017 So. 28th Ave., Minneapolis.

Nebraska

Forrest Coon is chief engineer for the Horse Shoe Lake Drainage District which has under way 212,000 yards of drainage. He may be reached at Gordon.

North Carolina

At a recent highway letting at Raleigh the following contractors were low bidders on the following projects:

Project No.

272 R. E. Martin, Mountain City, Tenn.
300 T. W. Chandler, Virgilina, Va.
400 R. N. Walker Co., Atlanta, Ga., Propo. No. 1.
538 J. L. Brinkley, Thomasville, N. C.
566 Gibson Constn. Co., Knoxville, Tenn.
567 C. E. Teague, Augusta, Ga.
577 Lampton & Bucks, Louisville, Ky.
731 G. R. Martin, Salisbury, N. C., Davie Co.
855-B Luten Bridge Co., Knoxville, Tenn.
860 J. F. Mulligan Constn. Co., N. Wilkesboro, N. C.
904 Asheville Paving Company, Asheville, N. C.
940 Alexander & Patton, Swannanoa, N. C.
140 Von Glahu & Talbot, Spartanburg, S. C.
154 So. Willite Pav. Co., Richmond, Va.
654 Lampton & Burke, Louisville, Ky.
607 Geer & Wilson, Rutherfordton, N. C.
377 R. E. Martin, Mountain City, Tenn.
166 W. D. Murray Sadler Corporation, Norfolk, Va.
174 D. E. Williams, South Mills, N. C.
196 W. H. Thompson, Burlington, N. C.
210 Union Paving Company, Philadelphia, Pa.

Notes from the Pacific Coast

Conners & Hansen of Santa Rosa, Calif., were declared the low bidders for work on 17.31 miles of highway between Forsythe Creek and Outlet Creek in Mendocino county, with a bid of $23,500.00.

Grant Smith & Co. were lowest on construction work between King City and the south side of Salinas river in Monterey county, with a bid of $23,500.00.

Proposal by the Western States Gas and Electric Company to expend $100,000,000.00 in a new hydro-electric project marks another step in the rapid advance in the development of this industry in California. This project is outlined in an application on file with the State Railroad Commission in which the Western States Gas & Electric Company and the El Dorado Power Company, a subsidiary corporation, seek permission to sell the first $5,000,000 issue of the new bonds. Details of the plan include the development of 100,000 horse power four-stage hydro-electric power by means of the construction of six reservoirs located on the headwaters of the south fork of the American river. The plans have already received the indorsement of the Federal Power Commission, according to the application, and a Federal license has been issued to the company. The site of the project lies in three counties, El Dorado, Alpine and Amador, and as soon as the snow melts construction work will begin there and on a power plant at Placerville. Manager Samuel Kahn of the Western States Gas & Electric Company announces that the storage project will include: Medley lakes, 10,000 acre feet; Twin or Capler lakes, 25,000 acre feet; Echo lake, 2000 acre feet; Silver lake, 25,000 acre feet; Alder creek reservoir, 25,000 acre feet, and Plum creek reservoir, 6000 acre feet.

Plans will be completed by about May 1st, by the San Diego Consolidated Gas & Electric Company, 301 Union Bldg., San Diego, for the construction of an irrigation and power project in San Diego County. It is planned to construct the following: Ditches, 15 ft. wide, 4 miles long; Diversion Dam, 6 ft. high, 50 ft. long, solid concrete, steel headgates; Storage Dam, 125 ft. high, 900 ft. long on crest, 25 ft. long on bottom, 2 ft. wide, vertical, reinforced concrete multiple Arch Type; Power Plant, water will be diverted from the Pauma Creek, a tributary of the San Luis Rey River and after the power is developed the water will then be used for the irrigation of approximately 5,000 acres of land. Estimated cost of this project is $100,000.

At the meeting of the directors of the Irrigation District in El Centro January 18, Superintendent Higley, who has charge of the river construction in Mexico, reported details of a motor trip he and his men took through the Pescadero Cut and to a point twenty-three

miles below it. The Bee river, which carries the water of the Colorado river from the point where it broke the Ockerson levee on the Valcano Lake, has turned into the Pescadero Cut to the extent of about 4,000 second feet, although it carried a much greater volume while the recent freshet was on. One barrel of the cut is finished and the second barrel is now being rushed with three giant dredges on the job.

Low bid for excavating and embankment along the Colorado river, for the Palo Verde Mutual Water Co., Blythe, Riverside County, was received from P. B. Engh, Pacific Electric Bldg., Los Angeles, who bid $0.22 per cu. yd. Work involves 218,687 cu. yds. earth; C. K. Clarke, Blythe, is Chief Engineer.

Bonds in amount of $2,000,000.00 have been voted by the Auxiliary Eastern Canal Irrigation District, Chandler, Arizona, to cover cost of construction of works for the District. Plans were prepared for this project by Engineers Howard S. Reed and Sheldon K. Baker, 419 Fleming Bldg., Phoenix, Ariz.

A proposal has been submitted by the Shattuck Construction Company, Underwood Bldg., San Francisco, and Marsh-Strong Bldg., Los Angeles, to the Sespe Light & Power Co., Mr. Frank Buren President, in the L. A. Stock Exchange Bldg., Los Angeles, for the financing and construction of the following projects for the Sespe Light & Power Company; Hammel Dam, 240 ft. high, 11,000 ac. ft. capacity; Power Plant, to develop 7,000 H.P.; Bradfield Dam, 240 ft. high, 40,000 ac. ft. capacity; Power Plant, 9,500 H.P.; Auxiliary Power Plant; developing 4,500 H.P. It is proposed to issue bonds through a holding company, the construction company to acquire an interest in the properties.

Complete program of the Sespe Light & Power Co. involves the construction of 6 dams, multiple arch type, and several large power plants in Ventura County. A contract amounting to $1,250,000.00 for the first unit of the work was awarded to Bent Bros., Los Angeles, last Spring.

E. Schelling, Los Angeles, recently started his 30-B Bucyrus shovel on a contract involving 10,000 cu. yds. of grading work at Eagle Rock near Glendale, Calif. Bill Fraser is engineer, and Bert Linsey fireman.

Plans have been completed and protests cleared up in connection with an irrigation project in Long Valley, Lassen Co., represented by J. G. Hooper, Constantia, Calif. 17,000 ac. ft. per annum will be stored from Long Valley Creek to be used for the irrigation of 4,000 acres of land, work involving reservoir-dam, 50 ft. high, 480 ft. long on top, 150 ft. long on bottom, of rock and earth fill, with a concrete core 1 ft. wide from bedrock to height of 20 ft., slope on front 4 to 1, on back 2½ to 1. Dam will be reinforced with steel rods.

Ditch, 7 miles long, 15 ft. wide, concrete lined where necessary. Estimated cost of project $216,000. It is planned to start construction by June 1st, if application No. 2016 for water rights is granted by that time.

Initial steps to construct a dam in San Gabriel canyon to harness mountain flood waters was taken by the Board of Supervisors. The board made a small appropriation to begin an investigation of the project.

It is expected that the government, the state and the county will co-operate in building this dam, which will be 426 feet high at an elevation of 1775 feet. The reservoir created by this dam will contain 32,200 acre feet. It will be seven miles long.

During the recent rains the San Gabriel went on a rampage, tearing out two bridges and at one time threatened to invade Baldwin Park.

Contract has been awarded to F. Rolandi, 550 Montgomery St., San Francisco, who bid $177,484.00 for the construction of 5.7 miles of highway in Mariposa County, using corrugated metal pipe.

Plans have been completed by the El Dorado Power Co., for extensive hydro-electric development work on the American River, near Placerville. Work will be started as soon as the snow has melted, to be completed by Jan. 1, 1924.

Mr. W. I. Kettlewell, a Kingsburg, Calif., contractor, was a recent caller in San Francisco.

Mr. M. S. Boss, of Portland, Oregon, is in charge of the Warren Construction Company's work at Fresno, consisting of 55 miles of railway in connection with the Sugar Pine Lumber Company's development there.

Bee River channel was closed February 27th, by order of Chief Engineer Carberry of the Imperial Irrigation District, and the entire flow of the Colorado is being forced through Pescadero cut, with exception of about 1,500 feet of water which seeps through the rock dam. Deposits of silt in the rock will in a few days stop the seepage. The flow down the cut February 28th, was 7,300 second feet.

One of the largest contracts for trackage ever let by the Santa Fe Railroad was awarded last month to Sharp & Fellows, at Los Angeles.

Bidders from all parts of the country attended the letting which made the competition more keen.

The contract calls for the expenditure of approximately $7,000,000 in grade work, as well as large amounts for bridges, culverts and other work that goes with the grading. About $22,000,000 altogether will be used on the line this year, aside from new equipment.

The work is being subcontracted and Mr. J. P. Gilmore, representative of Sharp & Fellows, is on the ground and expects to have at least 25 subcontractors, 7 steam shovels, 1,000 teams and 3,000 men on the job.

Construction is proceeding on the Santa Ana branch of the Union Pacific R. R., in Southern California, from Whittier to Santa Ana. The additional mileage from Whittier to Santa Ana will be 23.3 miles, and from Whittier to Fullerton will be 12.6 miles. Bids are being asked by the Union Pacific R. R. covering all phases of construction on that portion of track from Whittier to Fullerton. This new branch will pass through La Habra, Fullerton, Anaheim, Orange and Santa Ana.

The Minarets & Western R. R. has awarded a contract for a 35.5-mile standard gauge railway from Fresno. Calif., into timber lands, to the Warren Construction Co., Rialto Bldg., San Francisco, and Journal Bldg., Portland, Ore., at a cost of $800,000.

North Dakota

The Great Northern Ry. plans to lay 7.3 miles of second track from Surrey to Minot, at a cost of $140,000.

Oklahoma

The Oklahoma Southwestern Ry. has awarded a contract to the Allanders-Davis Construction Co. to build extension from Nuvaka to Henrietta, about twenty miles.

The Atchison, Topeka & Santa Fe Ry. is planning to renew construction of a new line between Owen and Pawhuska, in Osage county, which is 35.3 miles long, and which will cost $2,400,000.

St. Louis Items

BY A. B. KOENIG

St. Louis had the best old-time Contractors Convention on Feb. 27th and 28th that was ever known. In reality it wasn't a convention but a congregation of all the prominent railroad contractors in this part of the country to submit bids on five good sized steam-shovel jobs to be let by the Frisco Railroad in the states of Missouri and Kansas. Grant Smith & Co. of St. Paul came under the wire first on four of them in Missouri. The Walsh Construction Co. of Davenport, Iowa, landed the job between Spring Hill and Paola, Kansas. The J. W. McMurray Contracting Co. will do the masonry and concreting on this job. James Hedges will do the masonry and concreting on the four Smith jobs in Missouri.

Everybody enjoyed themselves and there were more railroads built here in two days than all the government treasuries of the world will be able to finance.

Jones & Jordan landed four miles of state road work near California, Mo.

J. W. McMurray who has been drinking crazy water at the Crazy Hotel, Mineral Wells, Texas, showed up looking finer than ever. Mack says he lost about 15 lbs. but can well afford to lose it as it won't take him very long to put it back whenever he takes a notion.

Scott & White are going to sublet the grading on their Santa Fe work west of Santanta, Kansas. They will do the balance of the work themselves. Up to the present time they have not let any of the grading, but we look for Al Gilliland, W. A. Colt & Son and Jack Collins to be on the line.

Contractors intending to bid on any of the Missouri state road work coming up will find a complete list of work to be let on file at Koenig Labor Agency, 612 Walnut St., St. Louis, Mo.

J. L. Simmons dropped in on his way back from Florida. Simmons has a 15-team outfit idle at La Plata, Mo.

The General Contracting Co. 357 W. 63rd St. Chicago, Ill., have a good rock outfit idle that they can place on work immediately.

G. V. Cooper, 711 Grant Court, Davenport, Ia., wants a slip, fresno or wheeler job suitable for a 6 to 14-team outfit.

J. L. Keller got in on 6 miles of road work in Kiowa County, Kansas. Moving his headquarters to Sun City, Kansas.

Alexander Maitland of the Kansas City Bridge Co. is ill at home in Kansas City and under his physician's orders will refrain from work for a few weeks. There is nothing serious in Mr. Maitland's condition, but his physician has said rest was imperative.

The Bryant Paving Co. of Waterloo, Iowa, with a bid of $149,023 were low on the Lamar-Somerville-Linden thoroughfare project in Memphis, Tenn. This Company just completed 60 miles on the Arkansas-Louisiana highway. They will move this outfit to Memphis immediately.

A. P. Munsen, Marion, Iowa, wants to sublet 33,781 yards of grading and 20,243 yards of sideborrow on 6.4 mile stretch of road between Huntsville and Clifton Hill, Mo. The sideborrow is all on one mile. No grubbing or clearing.

Lynch and McDonald, Moberly, Mo., and the St. Louis Bridge & Supply Co. of St. Louis were low bidders on 10 miles of grading and bridging in Iron County, Missouri.

Contractors when in want of work or labor for their outfits write Koenig Labor Agency, 612 Walnut St., St. Louis, Mo., or 501 Delaware St., Kansas City, Mo.

Russell Condon of Omaha has started on a paving job near Quincy, Ill. Condon says they have a good standard gauge outfit idle that they will rent or lease to responsible contractors. A letter addressed to 311 Karbach Block, Omaha, will reach him.

R. H. Herron is about through with his work at Providence, Ky. He would like to move his 8 teams on to some new work down his way.

Grant Smith & Co. had part of their engines and big shovel outfits on the way south ten hours after contract was signed with the Frisco Railroad, and were doing business in their new branch office that they established in the Merchants Laclede Bldg. here two hours after. Some record for speed but what else can you expect with "race horses" like Swan Benson, H. H. Hunt and Geo. R. Putnam on the job.

There never was a meeting of contractors complete without H. F. (Big) Riley of Clapp, Norstrom & Riley, Chicago. Riley spent a couple of days here with the boys, entertaining, doing business and left for Ohio to do some more business. There is only one in the country (Big Jack McCaughey) that can make more noise than Riley, but Jack failed to show up and the honors were all awarded to Riley. By the way Riley, don't forget the deed to fishing resort up on your farm that you promised Koenig.

We are under many obligations to old pal Jim Dunn of Dunn & McCarthy, and President of the best ball team that ever happened for an elegant photo of himself and the World beating Cleveland Baseball Club. Brings back many pleasant reminiscences of the past Jim to look at them. Here's hoping we will soon see them again.

Wm. Brothers is finishing his levee work at Warsaw, Ill. Brothers is scouting around trying to locate a job suitable for his team outfit which is a good one.

Costello Bros. were awarded 27 miles of heavy rock work on state road between Topton and Alma, N. C. Sublet this to Condon Bros. and Geo. R. Demster of Knoxville, Tenn. In addition to this Costello Bros. have some heavy state road work near Smithland and Waverly, Ky., which they are doing with their own outfits. C. J. Fox is in charge of the Waverly job, while Rich Costello is holding down the Smithland job.

Cameron, Joyce & Co., Keokuk, Iowa, have 60,000 yds. of team work to let near Gale, Ill. Lane & Maloney at Gale will be pleased to show contractors over this work.

A. W. Good has an outfit at work on Cameron, Joyce & Co's. job near Gale, Ill.

P. W. King and Harlow A. Verney of P. W. King & Co., boarding contractors, Salamanca, N. Y., were here the other day renewing old acquaintances. This firm has opened a branch office at 1207 W. Washington St., Chicago with Mr. Varney in charge to look after their western business.

S. Hanephin has his 12-team outfit working by the day at Trenton, Mo. but is ready to move on to a contract job as soon as he can locate a suitable one.

M. M. Small, Supt. of Huffman & Co. passed through here on his way to Benton, Ill., to begin on their new paving job that they landed there a short time ago.

E. L. Chester, Mason City, Ill., writes that he has a 10-team grading outfit idle there.

Roy Clubin, Gillispie, Ill., wants a job suitable for a 6 or 8-team outfit.

I. W. R. Thompson was low bidder for excavating approximately 170,000 yards for the river Terminals of Memphis, Tenn. W. F. Schultz, Chamber of Commerce Bldg., Memphis, Tenn., is Engineer for the Terminal Commission there.

John Marsch of Chicago played in bad luck lately. Was second low man on the Frisco work at Crocker, Mo., and just got beat by a few dollars on 170,000 yards of shovel work at Memphis, Tenn., but it won't be long before you will hear of Marsch being in on some good size job. He is not the kind to let his outfit remain idle long.

Walter Lonergan has sublet a part of his state road work near Jacksonville, Ill., to A. J. Brady.

W. W. Anderson has 218,000 yards of dragline work on a road job near Ste. Marie, Ill., to sublet.

J. M. Slaughter has taken a piece of road work from W. A. Ross near Troy, Mo.

A. L. Cook, Ottawa, Kansas, is low bidder on 56,000 yards of state highway work near Maryville, Mo.

The Industrial Track Construction Co. of St. Louis are putting in some sidings at Madison, Ill.

C. F. Lytle, Sioux City, Iowa, who has operated extensively in the northwest as a paving contractor for a number of years is anxious to place some of his outfits on similar jobs in the South.

E. P. Montblanc of the General Contracting Co., Chicago, is here looking over various jobs in this part of the country. Will probably report something new about this firm in next issue.

The Jos. Ballinger Contracting Co. have opened an office at 4040 Olive St., St. Louis. Are in the market for any kind of heavy basement grading, steam-shovel and betterment work.

Bids were opened on Feb. 28th by the Frisco Railroad for grading and double tracking their line between Windsor and Valley Park, Mo. Two-mile line change at Crocker, Mo. Double tracking at Swedeborg, Mo. Changing line at Guernsey, Mo. Grading and double tracking between Paola and Spring Hill, Kansas. All heavy steam shovel and rock work. Grant Smith & Co. of St. Paul were awarded the four Missouri jobs and the Walsh Construction Co. of Davenport the work between Spring Hill and Paola, Kansas.

Swan Benson arrived here from Washington to take charge of Grant Smith & Co's. work on the Frisco Railroad. H. H. Hunt, Secy. and Treasurer of this company is here temporarily to get their office force in their new office in the Merchants Laclede Building, St. Louis, organized.

The Walsh Construction Co. have started work on their new Frisco contract between Paola and Spring Hill, Kansas. Had an outfit idle in Kansas and did not take them long to move it and get busy.

The Bates County Court at Butler, Mo., has employed E. C. L. Wagner as Assistant County Engineer and he will prepare plans and arrange for the letting of the contract of the proposed new bridge over the Osage River on the Bates-Vernon County line. The contract will be let soon.

L. P. Yale and M. D. Huckins of the firm of Yale & Reagan came down from Chicago and landed two nice pieces of work, one a 500,000-yard dragline job near Winfield, Mo., and 300,000 yards of steam shovel work west of this city on the Frisco Railroad from Grant Smith & Co. Are going to move two outfits on the Frisco work immediately. A. W. Riney will be in charge.

Southern States Notes

BY C. N. BALLENTINE AND E. J. WILKIE

Hall Construction Company have their 70-C Bucyrus shovel on a large stripping contract near Palmetto, Fla. Overburden is being removed from a Fullers earth deposit for the Atlantic Refining Company.

Mr. F. A. McKenzie, contractor, is now located at No. 205 N. W. 17th Court, Miami, Fla.

Finley Method Company, Jacksonville, Fla., were successful bidders on a large road contract recently let in Manatee-Oneco Road District, Florida.

Megathlin & Clark, Miami, Fla., were low bidders on the drainage canal work in the Highland Glades Drainage District. Bids for this work were opened at West Palm Beach, Florida, on March 11th.

Smith Brothers of Dallas, Texas, were recently awarded contract for the construction of 21 miles of brick road in Eastland County, Texas. The cost of this road will be about $800,000.

Tate & Company were low bidders on 35 miles of road work in Calhoun County, Mississippi.

The Eudora Western Drainage District of Chicot County, Arkansas, are considering going ahead with the construction of the drainage ditches as proposed by their engineers, Baxter Engineering Company, of Little Rock.

Miller Levee District Commissioners of Texarkana, Arkansas, are planning to let some levee construction work during the summer. They recently sold some bond issues. C. S. Christian of Texarkana is the Engineer.

Douglas, Burt & Buchanan Co. of Shreveport, La., are about to commence operations of some levee work in Red River County, Texas.

The Bertha Mining Company is erecting a new mill near Cartersville, Georgia. This company is mining barytes from a nearby hillside. The barytes occur under an overburden of clay. Small revolving shovels are used to strip the overburden and load the material. Mr. L. B. Womelsdorf is Superintendent in charge of operations.

Mr. W. M. Bruce is running an 18-B revolving shovel for the above company.

White Contracting Company of Chatham, Virginia, are busy on a sand clay road job near Barnwell, South Carolina. About one-half mile of the road crosses Salkenhatchie swamp on a fill about eight feet high. Mr. J. Spencer White stated that they expected to finish at an early date and move to a new contract in North Carolina.

Battershill, Chandler & Goode have recently received a large amount of road work near Virgilina, Virginia.

Work is progressing nicely on the Santee River highway bridge near St. Stevens, S. C. Cornell-Young Company have the contract for the approach fills and are using standard equipment to handle the material.

Preliminary grading has been started and construction is being pushed on the new Vanderbilt Athletic field and stadium at Nashville, Tenn. The stadium will be patterned after the Yale bowl and will be built of reinforced concrete. At first only seating capacity for 20,000 will be built. The plans call for an ultimate seating capacity of 56,000. The Gould Contracting Company of Nashville, Tenn., have secured the grading and concrete work.

Surveys have been completed and plans are being made for the construction of a railroad from Signal Mountain to Crossville, Tenn. The proposed route would connect with the rails of the Chattanooga Traction Company at Signal Mountain, Tennessee; and with the Tennessee Central at Crossville. The line will follow the encasement of the Cumberland Plateau and will traverse a region rich in undeveloped coal fields. Mr. C. E. James, James Building, Chattanooga, Tenn., is in charge of development.

Mr. F. G. Bradshaw is operating an Erie B for Beckham, Bender & Crox, who have secured contract for the foundation of the new Memorial Auditorium at Chattanooga, Tennessee.

Mr. L. C. Gillen is operating a Bucyrus 18-B for Galley & Meyers, La Grange, Tennessee. This machine is to be used to load gravel for the Ludlow Gravel Company. Mr. Gillen's address is 19 David St., Ludlow, Ky.

The Signal Mountain Portland Cement Company of Chattanooga, Tenn., have recently begun grading preparatory to erecting a large mill at Glendale, a point alongside of Signal Mountain and about five miles from Chattanooga. Mr. E. J. Reeves is handling an Erie B for the above company.

Mr. W. C. Cox of Cedartown, Ga., has been operating a Bucyrus 45 for the Woodstock Iron Company in their iron mines near Cedartown.

Mr. L. W. Lee is digging sand and gravel with a 30-B for the Spruce Pine Sand and Gravel Company at Spruce Pine, Alabama.

Mr. J. T. Moses called recently. Mr. Moses has been running a 14-B for C. L. Flournoy of Jasper, Texas, and is back home for a short vacation.

The Muscle Shoals Rock Asphalt Company has recently been incorporated and will develop extensive rock asphalt deposits which they own near Russellville, Alabama. This material is a high-grade natural asphalt and after being mined and crushed is applied directly to the road surface without heating. The new plant will have a capacity of 1000 tons daily.

Our old friend W. S. Dixon has for the past seven months been operating an American Ditcher for the Southern Pacific, Atlantic System on a slag loading job near El Paso, Texas.

On March 1st he started a 70-Ton Bucyrus at the Toronto Rock Quarry about 225 miles east of El Paso. This shovel will be used for loading rock into 4-yard dump cars which transport the material to two Austin crushers.

J. T. Holdner is craning the shovel and John Moore, firing.

The Milltown Airline Ry. is planning an extension of line from Milltown to Racine, Ga., about eighteen miles. W. L. Miller, Milltown, Ga., is General Manager.

The Tennessee Central Ry. contemplates building an extension of 20 miles in the vicinity of Nashville, Tenn.

Washington

The Northern Pacific Ry. has awarded a contract for 22½ miles of double tracking from Lamona to Bluestem, to Grant Smith & Co., Henry Bldg., Seattle, Wash., to cost $300,000.

The Great Northern Ry. plans laying nine miles of second track from Dean to Hillyard, Wash., costing $180,000; and 2.7 miles from Spokane to Ft. Wright, costing $54,000.

West Virginia

Waugh & Vicellio are building three miles of highway two miles west of St. Albian. L. S. Coleman and Lee Vance are shovel engineers on their Erie shovel.

Wisconsin

A. F. Leifermann is running a Marion Model-28 for Funk & Rasmussen, La Crosse, on road work. His address is 525 First Street, South Montevideo, Minnesota.

Canada

Eastern News

BY J. M. WARD, MONTREAL

The city of Montreal has been visited this winter with many disastrous fires. The latest and worst one occurred on the night of March 3rd when the City Hall was reduced to a mass of ruins. Many valuable and historic documents, paintings, etc. have been destroyed. It is the intention of the city authorities to immediately make arrangements for the construction of a new building which they estimate will cost about $2,500,000.00.

The city of Montreal is preparing a list of public works and will submit same to a vote of the citizens, seeking authority to make a loan of $3,000,000, same to be expended on sewers, subways and bridges.

The Montreal Public Service Corporation has had their Hydro-Electric Development bill passed by the Provincial Legislature and expect to proceed at once with the development of the Carillon power. This is about forty miles from Montreal. Sprague & Henwood of Scranton, Pa., have a contract to do the diamond drilling on the site. Dwight P. Robinson & Company of Montreal and New York have undertaken to make the engineering report. It is expected that contract for this will be placed very shortly.

Normand & Normand of L'Islet, Que. have been awarded the contract for thirteen miles of gravel road at S. Rose du Degele.

The Kennedy Construction Company of Montreal has been awarded the concrete work on the new T. & N. O. extension at Cochrane, Ont. This amounts to about $20,000; also J. A. Brennan of Arnprior has the contract to take out timber for this same work.

Tenders for the new $3,000,000 Hotel-Dieu Hospital at St. Hyacinthe, Que., will be called for in April.

The Provincial Government of Quebec has called for tenders for ten miles of gravel road between Sorel and Montreal and the Town Council of Levis, Que., has called for $50,000 worth of Macadam roads.

The Provincial Government of Quebec expects to call for a $500,000 Bascule Bridge at Chicoutimi, Que.

The city of St. Johns, Que., contemplates the expenditure of approximately $250,000 for roads, subways and sewers. The Nova Scotia Clay Works of Elmsdale, N. S., contemplates the installation of two periodical kilns.

Toronto and Vicinity

BY C. F. ENGLAND, TORONTO

The eighth annual conference on road construction, called by the Hon. W. A. McLean, Deputy Minister of Public Works, was held in Toronto, February 27th and 28th. While this conference was specially intended for County Road Superintendents and Engineers there was also a considerable attendance of Township Superintendents, and upwards of two hundred officials altogether attended the two-days' session. This conference is a very important one as it embodies a real heart to heart talk between the Provincial Highway Department and the County Road Superintendents and Engineers on the programme of work lying immediately before them.

The Ontario Good Roads Association met on the three succeeding days, March 1st, 2nd and 3rd, at the Veterinary College of the University of Toronto. The Hon. F. C. Biggs, Minister of Public Works, outlined in an excellent speech the activities of the Highway Department in its relation to County and Township road building. The general discussions by the Township Superintendents showed how practical these men are in getting work done, frequently under very adverse circumstances. The Annual Banquet was held in the King Edward Hotel on Thursday the 2nd and was well attended.

March 6th was the big day for receiving bids on Ontario Provincial Roads. There are approximately 300 contracts to be let and up to the time of going to press no announcement has been made thereon, it is expected, however, that the Department will release this work as rapidly as possible so that gangs can be at work by April 1st or as soon thereafter as possible. Bidding was keen as evidenced by the fact that upwards of 2000 bids have been tabulated. With such keen competition there was naturally a considerable crowd at the Parliament Buildings, amongst whom we noticed the Standard Paving Company, Port Arthur Construction Co., E. G. Law, Dufferin Construction Company, King Engineering & Contracting Co., Godson Contracting Co., Warren Bituminous Paving Co., Constructing and Paving Co., Kilmer & Barber, Lumsden Engineering & Contracting Co., etc. etc. etc.

The firm of James. Proctor & Redfern, Ltd., will receive bids until April 3rd on 14,000 cubic yards of earth excavation work which is a new road grade on the Township boundary between Markham and Whitechurch Townships near Toronto.

The Province of Ontario Hydro-Electric Power Commission will receive tenders on April 10th for widening and deepening the channel of the Welland River, which is a portion of the Chippewa Power Canal Project. At the same time they will receive bids for the construction of the concrete intake and ship canal at the Niagara River. Plans and specifications may be obtained at the offices of the Commission in Toronto or Niagara Falls, Ont.

The Ontario Legislature will place itself on record this session in favour of the Deep Waterway for the St. Lawrence River. Unquestionably this project means a great deal to the Middle West on both sides of the line. It is most important for both Americans and Canadians around the Great Lakes to see the great national benefits to be derived from this project for the present and coming generations and should not be obscured by any local prejudices or interests which imagine they are going to be injured by this important improvement.

The City Council of Toronto has decided to pave with asphalt a number of streets at an estimated cost of $95,600.00, tenders for which will be called for shortly.

The contract for the Carrillon Hydro-Electric Development for the Public Service Commission of Montreal has been awarded to D. P. Robinson & Company of New York and Montreal. The contract for diamond drill boring has been let to Sprague & Henwood of Scranton, Pa. A. C. Barker, Dominion Express Bldg., Montreal, is General Manager in Canada for the Robinson interests.

A. E. Rigby of St. Catharines, Ont., has recently taken a sub-contract from J. P. Porter, Standifer & Porter Bros., for embankment work on the new Welland Ship

Canal. We understand that this covers about 175,000 cubic yards of earth handling.

An Eastern Ontario Roads Association is contemplated with Headquarters at Kingston, Ont. This will represent the interests of the Eastern counties and it is likely they will call a convention in May. There has been a feeling in the eastern parts of the Province that the western section has been favoured with a larger mileage of Provincial roads than the east and one of the objects of the Association will be to stimulate Provincial subsidized roads in that part of the Province.

Vancouver and Vicinity

Mr. David W. Johnston, of New Westminster, was appointed municipal engineer of South Vancouver, succeeding Mr. F. J. Whittacker, who has taken over the position of City Engineer of Prince Rupert, B. C.

Col. A. MacDonnell and General J. Stewart, of Grant, Smith & Co., & McDonnell, Ltd., contractors of Vancouver, sailed from New York recently for England. They will visit the Gold Coast in connection with an important contract which they have received from the British Government for constructing docks, breakwater and railway.

W. T. Reavley, superintendent of the Drum Lummon mines, plans the construction next summer of a railway from the mine to the water, a distance of three-quarters of a mile; also the erection of a loading wharf.

The Dominion Department of Public Works awarded the contract for the construction of repairs to groins Nos. 1 and 3 at Annieville Bar, Fraser River, to the Fraser River Pile Driving Co., New Westminster, B.C., at $6,432 (unit price).

TRADE NOTES

The Orton & Steinbrenner Co. of Chicago and Huntington, Ind., manufacturers of locomotive cranes, clamshell and orange peel buckets and coal crushers have made arrangements with J. Ross Bates formerly connected with Wonham Bates & Goode Trading Corp., of New York and Boston to represent them in the New England States and New York City.

Mr. Bates has offices at 136 Liberty St., New York City and 128 School St., Watertown, Mass.

Mr. Robert M. Gates has recently become associated with The Superheater Company, with his headquarters at the general offices of the company, 17 East 42nd Street, New York City. Mr. Gates was formerly a partner of the Herron Gates Company of Cleveland, Ohio, handling power plant equipment, prior to his association with the Lakewood Engineering Company. In his recent connection with The Superheater Company, Mr. Gates has reentered the power plant field.

The S. G. Taylor Chain Company desires to call to the attention of their various customers the fact that we are now in our forty-ninth successive year of chain manufacturing, having been organized in 1873.

We have made several additions to our factory and also improvements in the manner of welding our steam shovel chain to keep abreast with the demand for high-grade steam shovel chain.

Our office is located at 640 Marquette Building, Chicago, and our factory, at Hammond, Indiana, where we produce our high-grade Taylor-Mesaba Chain which is a product made of a special grade of iron thoroughly rerolled and refined, free from steel or scrap. We also make a complete line of high-grade chain of all descriptions.

John F. Cushing, Vice President of Great Lakes Dredge and Dock Company, was elected to the presidency and H. C. Wild, President, was made chairman of the board of directors, according to an announcement made recently. Other officers and directors were re-elected. Mr. Cushing began his career with the Great Lakes concern sixteen years ago as a timekeeper.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review, in this column, such books and catalogs as are sent to us.

BOILER FEED WATERS. A Treatise for Engineers, Power Plant Operators and Owners, by Frederick Salathe, Ph. D., University of Zurich, Switzerland, and Herbert A. Kern, Ch.E., B.S. in Chem., University of Minnesota. This very well printed pamphlet discusses in detail the most common causes of boiler troubles, including scale, foaming and priming, and corrosion, and outlines the best methods of preventing these boiler troubles. Particular attention is paid to the causes of scale formation and methods of preventing it. Water analysis is discussed and complete chemical formulas for various water impurities are included. Tables showing the losses caused by boiler scale of different thickness are included. Owners and operators of steam shovels, locomotives, etc., who are not getting satisfactory results from boilers will find this book of interest and value. Copies may be obtained free of charge from the *Chicago Chemical Company, 1116 U. S. Annuity and Life Building, Chicago, Illinois.*

"The T. L. Smith Company, Milwaukee, Wisconsin, has published a new booklet on paving type concrete mixers. The booklet contains detailed specifications on models 10-E, 14-E and 21-E, together with photographs of Smith Paving Mixers in use in various parts of the country. Special attention is paid to the new full-caterpillar models, and the operation of their various features are described and illustrated in detail. Copies of this booklet will be mailed on request. *T. L. Smith Company, Milwaukee, Wis.*

FOR SALE

Four Bay City Walking Dredges

Florida Drainage & Construction Company

PALATKA, FLORIDA

FOR SALE

A SIX-WHEEL SWITCHING LOCOMOTIVE with separate tender. Weight of locomotive 105,600 pounds. Tractive power 20,750 pounds. Cylinders 18 inches diameter, 24-inch stroke. Wheels 44 inches diameter. Boiler pressure 160 pounds. Butt Strap Boiler. Tender two trucks; weight empty 30,342 pounds. Full interstate inspection.

THE OHIO & MICHIGAN SAND & GRAVEL CO.

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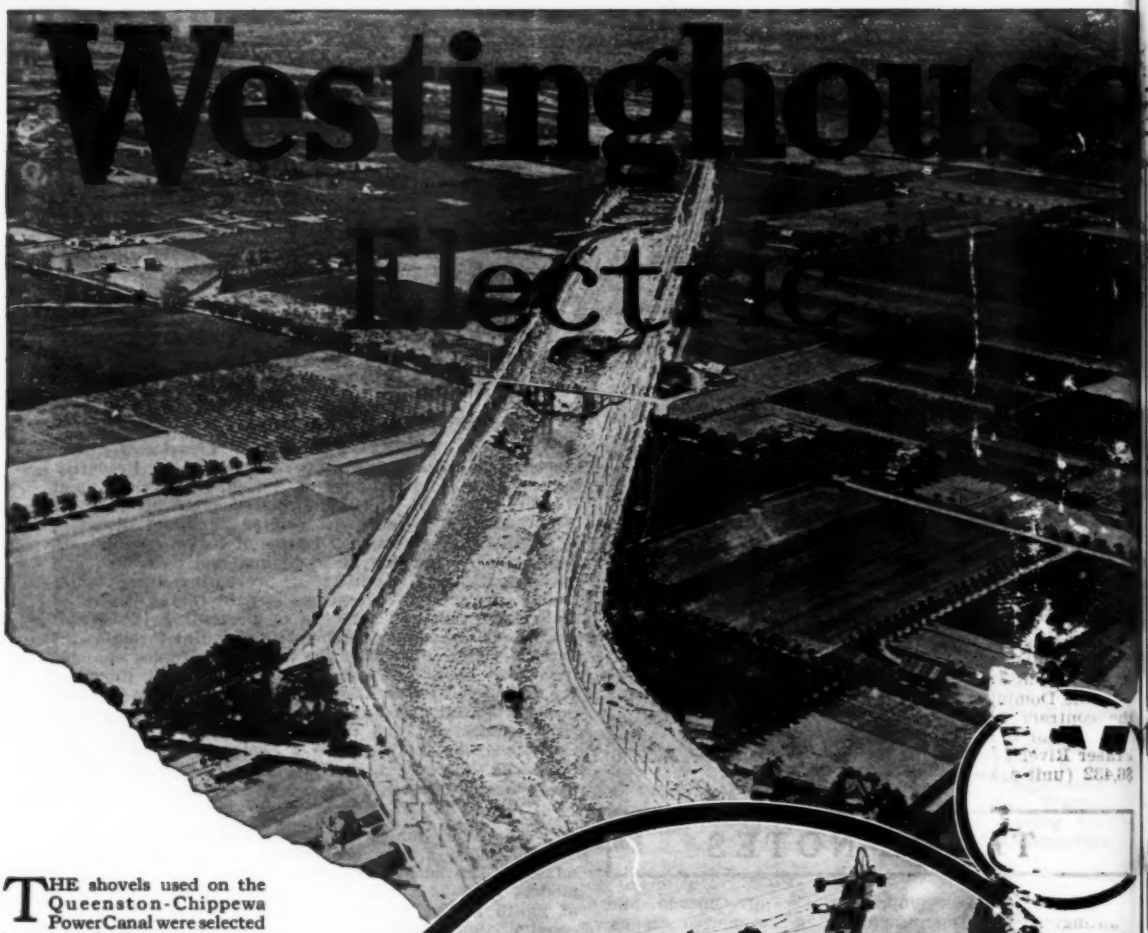

THE shovels used on the Queenston-Chippewa PowerCanal were selected because of their economy, speed in operation and large bucket capacity.

Seven of the shovels that worked on this project are Westinghouse motor-driven and three of these seven are the largest of their type yet built.

The recent successful completion of the enormous Power Canal was largely dependent on the unfailing operation of these big "electrics."

The Westinghouse motor-driven shovel requires no coal or water, it uses power only when in operation and requires fewer men for its operation than a steam shovel.

Details of Westinghouse motor drive for shovels can be obtained at any Westinghouse district office.

Westinghouse Electric & Manufacturing Co.

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Nothing to Watch But the Road

THAT'S why an Austin Motor Roller will do more and better work than any other. Because of its simplicity of control, the operator can watch his work all the time, and he wastes no time shoveling coal or taking on water.

An Austin Motor Roller will save you time and money in many ways. Better get acquainted before your next job.

The whole story is told in Catalog FW. It's yours for the asking and you will find it worth reading.

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"Everything from a Drag Scraper to a Road Roller"

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General view of shovel operations. Return bridge in the foreground, outgoing bridge behind camp buildings at the left. The material is being deposited between the two bridges for strengthening the fill. Three of these portable bridges were used, the third is being erected at a new point on the canal. This method cut down the haul and speeded up operations.

This view shows clearly the stiff character of the digging which the 30-B handled at the rate of 600 yards per day for the entire season with only two days' delay.